Additional Materials of the Late Miocene Rodents from the Namurungule Formation in the Samuburu Hills, Northern Kenya

AUTHOR(S):

KAWAMURA, Yoshinari; NAKAYA, Hideo

CITATION:

KAWAMURA, Yoshinari ...[et al]. Additional Materials of the Late Miocene Rodents from the Namurungule Formation in the Samuburu Hills, Northern Kenya. African study monographs. Supplementary issue 1987, 5: 131-139

ISSUE DATE:

1987-03

URL:

https://doi.org/10.14989/68334

African Study Monographs, Supplementary Issue 5: 131−139, March 1987

ADDITIONAL MATERIALS OF THE LATE MIOCENE RODENTS FROM THE NAMURUNGULE FORMATION IN THE SAMBURU HILLS, NORTHERN KENYA

Yoshinari KAWAMURA
Aichi University of Education
Hideo NAKAYA
Faculty of Education, Kagawa University

ABSTRACT Two specimens of thryonomyids newly collected from the Late Miocene Namurungule Formation are described. One is a grooved upper incisor, which is referred to *Paraulacodus* sp. Another is a molar with three transverse lophs, whose definite taxonomic position can not be determined. The similarity in the rodent faunas between the Namurungule Formation and the Ch'orora Formation of Ethiopia is suggested. It is concordant with the approximate coincidence of the radiometric ages of both formations.

INTRODUCTION

In the preceding report, we described the rodent specimen collected by the field survey of the Japan-Kenya expedition team in 1982 (Kawamura & Nakaya, 1984). This specimen obtained from Locality SH 22 in the Namurungule Formation was assigned to *Paraphiomys* sp., and we expected the occurrence of new materials in the next field season which provided further information for the specific determination of this specimen. In September 1984, two additional rodent specimens were found in the same formation by the same expedition team. Although these specimens are not suitable for the above-mentioned purpose, they provide us important knowledge on the Late Miocene rodent faunas of northern Kenya.

These new specimens were collected from surfaces of outcrops at Locality SH 51 which is situated 2.1 km west-south-west of SH 22. The exact horizon of the occurrence is attributable to the alternating beds of sand and mud below the thick mudflow deposits in the columnar section given by Makinouchi *et al.* (1984, Fig. 4). This horizon is also called "lower alternation" by Nakaya *et al.* (1984) where the Samburu hominoid and many mammalian fossils including the above-mentioned *Paraphiomys* sp. were obtained. Its absolute age is considered to be between 7.1 ± 0.5 and 10.7 ± 0.6 Ma on the basis of the K-Ar age determination (Itaya & Sawada, 1986).

SYSTEMATIC DESCRIPTIONS

Order Rodentia Bowdich, 1821
Superfamily Thryonomyoidea Wood, 1955
Family Thryonomyidae Pocock, 1922
Genus ***Paraulacodus*** Hinton, 1933
Paraulacodus sp.
(Fig. 1 ; Plate 1, figs. 1-4)

Material: 1 isolated right upper incisor (KNM-SH-15873).
Locality: Locality SH 51 in the Samburu Hills, north of Maralal, Kenya.
Horizon and age: Namurungule Formation ; Late Miocene.

Description

The specimen is represented by the anterior part of an upper incisor with an occlusal surface. Two distinct grooves are observed on the upper face of the specimen. They are well separated from each other by a wide central ridge. The medial groove is shallower and narrower than the lateral groove. The distance between the former and the medial margin is distinctly smaller than that between the latter and the lateral margin. The occlusal surface is elliptical with the anterior margin crenulated. The cross section of the specimen is broadly elliptical as shown in Fig. 1.

Measurements

The method of measurements is shown in Fig. 2.
Breadth of the anterior part (ba) ..... 3.8 mm

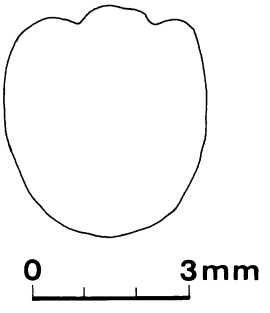


Fig. 1 *Paraulacodus* sp. Cross section of the right upper incisor (KNM-SH-15873). Anterior view.

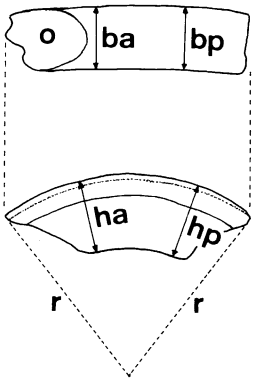


Fig. 2 Method of measurements of the upper incisor. For all abbreviations except **o** see text.
o: occlusal surface.

Breadth of the posterior part (bp)..... 3.8
Height of the anterior part (ha) 4.5
Height of the posterior part (hp) 4.4
Radius of curvature of the upper margin (r) 12.2

Discussion

Among the genera of Thryonomyidae hitherto known, *Thryonomys* and *Paraulacodus* have grooved upper incisors, but morphological differences are clearly observed between the incisors of these two genera. The upper incisor of *Thryonomys* has three narrow grooves on its upper face, while that of *Paraulacodus* has only two broad grooves. The cross section of the incisor of *Thryonomys* is transversely broad, but that of *Paraulacodus* is deeper than broad. Consequently the characters of the specimen described above are well coincident with those of *Paraulacodus*.

Two species are known as the components of the genus *Paraulacodus*. They are *P. indicus* Hinton from the Siwalik Series of Pakistan, and *P. johanesi* Jaeger, Michaux et Sabatier from the Ch'orora Formation of Ethiopia. In comparison with the descriptions of *P. indicus* (Hinton, 1933; Black, 1972), the present specimen is different from its upper incisor in the following points:

The present specimen is much larger, and has a broader cross section. The two grooves on the upper face are somewhat biased medially in the present specimen, while they are set in equally from the lateral and medial margins in *P. indicus*. The enamel cover on the lateral and medial faces is heavier in the present specimen.

In comparison with the description of *P. johanesi* (Jaeger *et al.*, 1980), the following differences are observed:

The present specimen is larger, and its cross section is less triangular and transversely broader. The grooves on the upper face are slightly narrower and deeper in the present specimen.

These differences seem to be too great to include the present specimen into one of these species. However, it can be said that the present specimen is rather near to *P. johanesi* than *P. indicus*. In this paper, the specimen is tentatively assigned to *Paraulacodus* sp. Its definite taxonomic position will be determined, when adequate materials to examine the variation will be obtained from the Namurungule Formation.

The Ch'orora Formation yields three forms of thryonomyids such as *Paraulacodus johanesi*, *Paraphiomys* sp. 1 and *Paraphiomys* sp. 2 (Jaeger *et al.*, 1980). On the other hand, the Namurungule fauna contains at least two forms of thryonomyids. These are *Paraulacodus* sp. described here and *Paraphiomys* sp. reported by Kawamura & Nakaya (1984). The former is rather similar to *Paraulacodus johanesi* as mentioned above, and the latter strongly resembles *Paraphiomys* sp. 1 of the Ch'orora fauna in tooth pattern and size. These faunal similarities are well coincident with the contemporaneousness of both faunas. The isotopic age of the Ch'orora fauna is determined between 10.5 and 10.7 Ma by Tiercelin *et al.* (1979), which is nearly equivalent to the age of the Namurungule fauna.

Thryonomyidae, gen. et sp. indet.
(Figs. 4-5 ; Plate 1, fig. 5)

Material: 1 isolated molar (KNM-SH-15874).
Locality, horizon and age: Same as the incisor of *Paraulacodus* sp. described above.

Description

In the advanced groups of Thryonomyidae, the upper molars tend to have simple patterns which resemble those of the lower molars (for example, *Paraulacodus* and *Thryonomys*). Therefore the determination of tooth kind is difficult in isolated molars obtained from sediments younger than the Middle Miocene. The present material has both possibilities to be an upper molar (M^1 or M^2) and to be a lower molar (M_1 or M_2). The exact determination is left pending, until more complete specimens are obtained from the same formation. In order to describe the present material, cusps, lophs and valleys are tentatively termed 1 to 4, 5 to 8 and I to III respectively, and the terminology for anatomical direction is given as a to d (see Fig. 3). The correspondence of these names with formal names is also shown in the same figure.

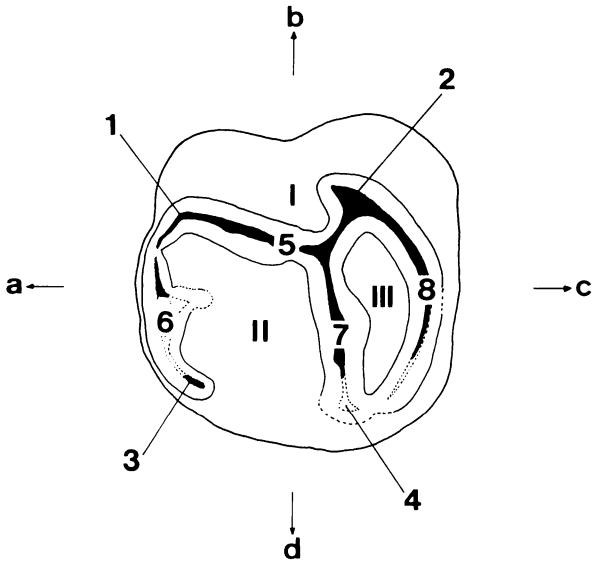
The crown of the present molar has a quadrate occlusal outline with round corners. It is relatively hypsodont, and has three transverse lophs (Lophs 6, 7 and 8). Loph 7 runs straight, and is arranged nearly parallel to Loph 6, while Loph 8 is arcuate. A weak spur projects from the middle of Loph 6 towards the bottom of Valley II. This spur may be a vestige of the forth transverse loph. Loph 7 is slightly swollen at its middle part. Cusp 2 is the largest cusp, from which a longitudinal loph (Loph 5) extends to Cusp 1. Valley I is relatively short, and not so deep. In lateral view, it does not reach the middle of the total height of the crown (Fig. 5). Valley II is much wider than Valley III. The former valley is deepest at the part near to Loph 7, and its floor gradually ascends towards Loph 6. Valley II opens between Cusps 3 and 4. This entrance is shallower than the other part of the valley. Owing to the wear of the crown, Valley III is completely blocked by the connection of Cusp 4 and Loph 8.

Measurements

Length of the crown ·····3.5 mm
Breadth of the crown ·····3.7
Maximum height of the crown ·····3.3

Discussion

This specimen is easily distinguished from the upper molars of *Paraphiomys* which have four or five transverse lophs. The lower molars of the same genus are characterized by three transverse lophs, although the short fourth loph, posterior arm of protoconid, is sometimes observed. The number of the lophs is therefore basically coincident with that of the present specimen. On the other hand, the lower molars of *Paraphiomys* usually have anteroconid on the anterobuccal corner



Tentative terminology adopted here		Formal terminology	
		In case this specimen is assigned to M^1 or M^2	In case this specimen is assigned to M_1 or M_2
Direction	a	posterior	anterior
	b	lingual	buccal
	c	anterior	posterior
	d	buccal	lingual
Cusp	1	hypocone	protoconid
	2	protocone	hypoconid
	3	metacone	metaconid
	4	paracone	entoconid
Loph	5	endoloph	ectolophid
	6	posteroloph	metalophid
	7	protoloph	hypolophid
	8	anteroloph	posterolophid
Valley	I	lingual valley	buccal valley
	II	postero-buccal valley	antero-lingual valley
	III	antero-buccal valley	postero-lingual valley

Fig. 3 Tentative terminology of the thryonomyid molar adopted in this paper. The relationship with the formal terminology is also shown in the right table.

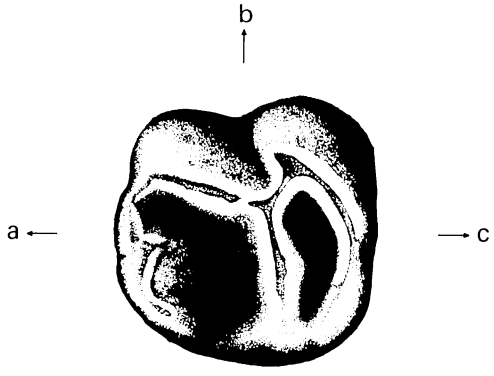


Fig. 4 Thryonomyidae, gen. et sp. indet. Occlusal view of the isolated molar (KNM-SH-15874).

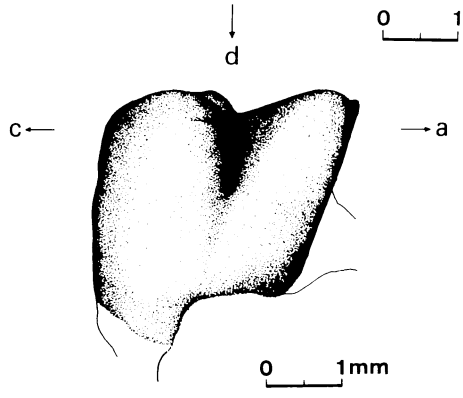


Fig. 5 Thryonomyidae, gen. et sp. indet. Lateral view (viewed from b) of the isolated molar (KNM-SH-15874).

of the crown. Such an additional small cusp is not observed in the present specimen. However, this cusp is lacking in some specimens which have been assigned to *Paraphiomys* (Jaeger *et al.*, 1980 ; Kawamura & Nakaya, 1984 etc.). In addition to this, the present specimen has the weak spur from the middle of Loph 6. The similar structure is observed in lower molars of *Paraphiomys stromeri hopwoodi* (Lavocat, 1973 ; P1.27, fig. 4). Therefore the possibility which the present specimen is a lower molar of *Paraphiomys* can not be excluded.

In comparison with upper molars of *Paraulacodus*, the present specimen is similar to them in many respects. They are 1) general outline, 2) proportion of each valley, 3) arrangement of each loph and 4) frequent presence of vestigial metaloph (corresponding to the spur of Loph 6). Especially, *Paraulacodus* aff. *indicus* described by Wessels *et al.* (1982 ; P1.2, fig. 14) is very similar to the present specimen, although the former is much smaller than the latter. Because the lower molars of the known species of *Paraulacodus* (*P. indicus* and *P. johanesi*) are characterized by the presence of anteroconid and the absence of the spur of metalophid, they are distinguishable from the present specimen.

Recently Flynn *et al.* (1983) described the cheek teeth of the Miocene thryonomyids collected from Pakistan, Saudi Arabia, and East and Southwest Africa, and gave a revision of them. Among them, the upper cheek teeth from Ngorora (KNM-BN 7800 ; Fig. 4b) are rather similar to the present specimen, but they are much smaller and lack any spur of Loph 6. The others are more different from the present specimen.

The upper and lower molars of *Thryonomys* are distinguishable from the present specimen in the general outlines and patterns, although each of them has three transverse lophs.

In conclusion, the present specimen is most similar to the upper molars of *Paraulacodus*, but the possibility to be a lower molar of *Paraphiomys* can not be omitted. Because of the scarcity of material, its generic determination is reserved here.

ACKNOWLEDGEMENTS We wish to express our appreciation to Professor Hidemi Ishida and the other members of the Japan-Kenya expedition team of 1984 for providing us the materials for this study. Sincere thanks are also extended to Mr. R. E. F. Leakey, Director Chief Executive of the National Museum of Kenya for giving us permission and facilities to study in the museum.

REFERENCES

Black, C. C., 1972. Review of fossil rodents from the Neogene Siwalik beds of India and Pakistan. *Palaeontology*, 15 : 238−266.

Flynn, L. J., L. L. Jacobs and S. Sen, 1983. La diversité de *Paraulacodus* (Thryonomyidae, Rodentia) et des groupes apparentés pendant le Miocène. *Ann. Paléont.* (*Vert.-Invert.*), 69: 355−366.

Hinton, M. A. C., 1933. Diagnoses of new genera and species of rodents from Indian Tertiary deposits. *Ann. Mag. Nat. Hist.*, Ser. 10, 12 : 620−622.

Itaya, T. and Y. Sawada, 1987. K-Ar ages of volcanic rocks in the Samburu Hills Area, Northern Kenya. *African Study Monographs, Supplementary Issue*, 5: 27-45.

Jaeger, J. J., J. Michaux and M. Sabatier, 1980. Premières données sur les rongeurs de la Formation de Ch'orora (Ethiopie) d'âge Miocène supérieur. I : Thryonomyidés. *Palaeovertebrata*, Mém. Jubil. R. Lavocat ; 365−374, 1 pl.

Kawamura, Y. and H. Nakaya, 1984. Thryonomyid rodent from the Late Miocene Namurungule Formation, Samburu Hills, Northern Kenya. *African Study Monographs, Supplementary Issue*, 2 : 133−139.

Lavocat, R., 1973. Les rongeurs du Miocène d'Afrique orientale. I. Miocène inférieurs. *Mém. Trav. E. P. H. E.*, Institut de Montpellier, 1 : 1−284, pls. 1−44.

Makinouchi, T., T. Koyaguchi, T. Matsuda, H. Mitsushio and S. Ishida, 1984. Geology of the Nachola Area and the Samburu Hills, west of Baragoi, Northern Kenya. *African Study Monographs, Supplementary Issue* 2 : 15−44.

Nakaya, H., M. Pickford, Y. Nakano and H. Ishida, 1984. The Late Miocene large mammal fauna from the Namurungule Formation, Samburu Hills, Northern Kenya. *Ibid.*, 2 : 87−131.

Tiercelin, J.-J., J. Michaux and Y. Bandet, 1979. Le Miocène supérieur du Sud de la Dépression de l'Afar, Éthiopie : Sédiments, faunes, âges isotopiques. *Bull. Soc. Géol. France*, Ser. 7, 21 : 255−258.

Wessels, W., H. de Bruijn, S. T. Hussain and J. J. M. Leinders, 1982. Fossil rodents from the Chinji

Formation, Banda Daud Shah, Kohat, Pakistan. *Proc. Kon. Ned. Akad. Wetensch.*, Ser. B, 85, 337−364.

Explanation of Plate 1

Paraulacodus sp.

Fig. 1 Upper view of the right upper incisor (KNM-SH-15873), ×5.

Fig. 2 Lateral view of the same specimen, ×5.

Fig. 3 Lower view of the same specimen, ×5.

Fig. 4 Medial view of the same specimen, ×5.

Thryonomyidae, gen. et sp. indet.

Fig. 5 Occlusal view of the molar (KNM-SH-15874), ×15.

Plate I